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No. XI.

Analysis of the Hydraulic Lime used in constructing the Erie Canal in the State of New York. By Henry Seybert.—Communicated on the 19th of July, 1822.

Philadelphia, 10th July, 1822.

DEAR SIR,

Agreeably to your request, I examined the Hydraulic Lime which you presented to me, and herewith transmit to you the detail of my experiments. In Professor Silliman's Journal, Vol. III. No. 2, p. 231, we have a statement of Dr. Hadley's analysis of this substance, viz. carbonic acid, 35.05; lime, 25; silex, 15.05; alumine, 16.05; water, 5.03; oxide of iron, 2.02 ;=98.20. On examining these results, it was evident that the proportion of carbonic acid was too great for the lime: from my analysis, it appears that he overlooked the *magnesia*, which forms an essential constituent of this mineral.

I am,

Very respectfully,

Your obedient servant,

H. SEYBERT.

Dr. James Mease.

Analysis of the Hydraulic Lime used in constructing the Erie Canal in the State of New York.

This mineral is greyish both in mass and powder. It is without lustre. Opaque. Amorphous. Fracture irregular. Fragments indeterminate. Yields readily to the knife, and is easily frangible. Fine grained; presenting an earthy aspect. Its specific gravity is 2.753.

Analysis.

A. Three grammes of the mineral, finely pulverised, were digested in a phial containing a determined weight of diluted muriatic acid. The addition of the acid to the mineral occasioned an immediate and violent effervescence. After three or four hours, when the carbonic acid was supposed to have been entirely disengaged, it was ascertained that the diminution of weight amounted to 1.18 grammes. Hence we have 39.333 per 100 of carbonic acid.

B. The mixture *(A)* was then submitted to ebullition. When all the soluble matter appeared to have been taken up by the acid, the whole was evaporated to dryness. The residue was treated with water acidulated with muriatic acid, and again moderately evaporated. It was then treated with more water, and filtered. The residue on the filter was nearly colourless; and after calcination it weighed 0.435 grammes. This residue was calcined with three parts of caustic potash in a silver crucible, and dissolved in an excess of diluted muriatic acid. By subsequent evaporation of the liquor, &c. it was found to consist of 0.353 grammes of silica on three grammes, or 11.766 per 100; and 0.82 grammes of alumina on three grammes, or 2.733 per 100.

C. The excess of acid of the liquor *(B)* was neutralised with caustic potash. On adding hydrosulphate of potash, there was produced a black precipitate, which, after being

roasted and calcined with a little nitric acid, yielded 0.45 grammes of peroxide of iron on three grammes, or 1.5 per 100.

D. After the separation of the ferruginous precipitate from the liquor *(C)* it was treated with oxalate of potash, which occasioned a voluminous white precipitate. This precipitate, after exposure to a high temperature, afforded 0.75 grammes of lime on three grammes, or 25.0 per 100.

E. The magnesia precipitated from the liquor *(D)* by an excess of caustic potash, after edulcoration and strong calcination, weighed 0.535 grammes on three grammes, or 17.833 per 100.

F. Three grammes of the pulverised mineral were submitted to a strong calcination. The diminution of weight occasioned by this treatment was 1.225 grammes. Now in deducting 1.18 grammes of carbonic acid *(A)* we have 0.045 grammes of moisture on three grammes, or 1.5 per 100.

We then have the following results, as the products of the preceding experiments, viz.:

(Per 100 parts.)

A.	Carbonic acid	39.333
B.	Silica	11.766
B.	Alumina	02.733
C.	Peroxide of iron	01.500
D.	Lime	25.000
E.	Magnesia	17.833
F.	Moisture	01.500
		99.665
		100.000
	Loss	000.335